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The Swedish Patent Office
PCT International Application

PCT/IB2022/092/72504 01-06-2004

PCT/IB 2002/002775 Nokia Corporation NM5232-01WO / NC23812WO

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Claims

- A method of pre-equalizing a transmission characteristic of a signal processing circuitry (200), said method comprising the steps of:
 - a) obtaining a difference between an output signal of said signal processing circuitry (200) and an input signal of a pre-equalizing function (15);
 - b) approximating a gradient of said difference based on said obtained difference and an approximation of said transmission characteristic; and
 - updating control values of said pre-equalizing function (15) based on said approximated gradient.
 - A method according to claim 1, wherein said approximating step comprises the step of calculating an approximation of a least mean square gradient vector of said difference.
 - 3. A method according to claim 2, wherein said gradient vector is calculated from a partial differential equation of a system cost function.
 - 4. A method according to any one of the preceding claims, wherein said difference is obtained by comparing signal envelopes of said output and input signals.
 - A method according to claim 4, wherein said input signal is a digital signal and said output signal is an analog signal.
 - A method according to any one of the preceding claims, wherein said control values are coefficients of an adaptive digital filter.
- 7. A method according to any one of the preceding claims, wherein said transmission characteristic is approximated as a delay function.
 - A method according to claim 7, wherein the delay of said delay function corresponds to the position of the maximum analog filter peak of said transmission characteristic.

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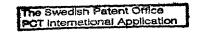


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9. A method according to claim 8, wherein said gradient vector is calculated using the following equation:

$$\nabla \{E\} = -2e[k] \cdot \underline{d}[k - \tau],$$

wherein

∇{E} denotes said gradient vector,

e[k] denotes said obtained difference, and

 $\underline{d}[k - \tau]$ denotes a vector representation of said input signal assessed by said delay approximation of said transmission characteristic.

10. A method according to claim 9, wherein filter coefficients are updated insaid updating step based on the following equation:

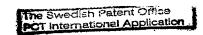
$$\underline{w}[k+1] = \underline{w}[k] + \mu e[k] \cdot \underline{d}[k-\tau],$$

wherein

 $\underline{w}[k+1]$ denotes a vector representation of updated filter coefficients, $\underline{w}[k]$ denotes a vector representation of current filter coefficients, and μ denotes a predetermined proportionality factor.

- 11. An apparatus for pre-equalizing a transmission characteristic of a signal processing circuitry (200), said apparatus comprising:
 - a) comparing means (71) for obtaining a difference between an output signal of said signal processing circuitry (200) and an input signal of a pre-equalizing means (15);
 - b) approximation means (72) for approximating a gradient of said difference based on said obtained difference and an approximation of said transmission characteristic; and
 - c) updating means (72) for obtaining control values supplied to said preequalizing means (15), based on said approximated gradient.
- 12. An apparatus according to claim 11, wherein said comparing means (71) are arranged to compare said input and output signals based on their envelopes.
- 13. An apparatus according to claim 11 or 12, wherein said approximation
 30 means (72) is arranged to approximate said transmission characteristic as a
 delay function and to approximate said gradient by using a least mean
 square approximation function.

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- 14. An apparatus according to any one of claims 11 to 13, wherein said signal processing circuitry is a direct conversion or heterodyne transmitter architecture (200).
- 15. An apparatus according to any one of claims 11 to 14, wherein said apparatus comprises a digital pre-equalizer means (15).